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ORIGINAL ARTICLES.

ON SUBCONJUNCTIVAL INJECTIONS AS A THERAPEUTIC MEASURE.

BY ADOLF ALT, M.D.

Since the new method of treating diverse diseases of the eye by means of subconjunctival injections has been introduced by Darier, numerous papers on this subject have appeared in European journals. Some of these evidently shot beyond the mark in their enthusiasm, while another number of authors, for some reason, could find no good in this method of local medication. If the literature of the country is a true criterion, Darier's method seems to have been but seldom put to a trial by American investigators. Having made use of this method of treating diseases of the eyeball, and particularly such as may be considered due to a microbic invasion of its tissues, for about a year, it may, therefore, not be amiss to record some of my experiences with it.

The solution which I have employed thus far has invariably been the one originally advocated, namely, bichloride of mercury 1:1000. Of this two minims were injected under the

conjunctiva near the corneo-scleral margin of the upper half of the eyeball. I tried, of course, always to do this as aseptically as possible. The needle is of platinum-iridium and can be purified by the flame. No disagreeable accidents have ever happened to me. To be sure, when a large nerve twig has been wounded, the pain is quite bad and lasting, and sometimes a small hæmorrhage occurs, but neither of these accidents resulted in more than a passing inconvenience.

The quantity of mercury being injected by means of this treatment appeared to me at first so small, that I doubted that this could play an important rôle in the effect. I am still of the opinion the counter-irritation due to the little operation has something to do with its effect, although, as repeated experiments have convinced me, the injection of water alone, or of a solution of boracic acid, seems to be followed by no decided effect on the course of the disease.

The first case in which I use the subconjunctival injection of mercury was so striking in its result, that I have employed these injections since then in a considerable number of cases.

The patient J. M. J., 28 years old had been suffering from recurrent iritis for 5 years. Every year he had three or four attacks for which he had always been treated in the usual way by atropia, salicylate of soda and mercury, although he denied syphilis. The attacks had always lasted from three to six weeks and although different specialists, of renown had treated him, nobody had, in his opinion, given him any lasting benefit. Having got him to confess to several attacks of gonorrhœa when he first came to see me on Jan. 13, 1893, because the right eye had been again attacked by iritis four days previously, I made him at once a subconjunctival injection. The eye at that visit was very greatly injected, the pupil small and bound down by several posterior synechiæ. Several instillations of atropia had no effect on it, and the patient was accordingly in a very gloomy mood foreseeing a siege of iritis as grave as any of its predecessors. However, when he called on me the next day, he reported great improvement. He had slept all night and had now no pain whatever. The synechiæ

had given way and the pupil was *ad maximum* dilated. The injection of the eye was considerably reduced. The patient felt so well, that he returned to business and did not reappear at my office, until six days later, he came "simply to let me see his eye." It was then in appearance perfectly normal and pale. Never had he experienced such magic relief before. He promised to return to let me know of any further changes.

About five weeks later he returned, because the other eye (the left eye) had begun to get inflamed during the night. Another attack of iritis being plainly visible, I made at once an injection. A week or so later he came just to tell me, that the injection had at once removed all symptoms and that he was free from all annoyance. He most forcibly attested the superiority of this new mode of treating his iritis and promised to return at the slightest sign of a further recurrence. He has, so far, not returned.

I have since seen similar results several times, although not every case was equally brilliant. The cases of iritis, whether idiopathic, specific, rheumatic or traumatic in which I have employed the subconjunctival injections, have invariably yielded to this treatment much more promptly and satisfactorily, than those in which no subconjunctival injections were employed.

In several cases of serous irido-choroiditis this new method of treatment has been the means of reducing the time and altering the course of the affection very considerably.

I am just now getting through with the case of a lady in the climacteric period who came to me on December 28, 1893, with severe iridochoroiditis serosa in the left eye. She counted fingers at $1\frac{1}{2}$, with the ophthalmoscope barely a slight reflex could be obtained. I injected sublimate every week with the result, that when I made the fourth injection on January 23, she had $V=20/_{xxx}+$. The pupil was large and round, a few dots on the Descemet's membrane were still visible, the vitreous body was perfectly clear and the fundus could be scanned in all its details. It revealed a large peripheral atrophic spot in the choroid. Surely the short time it took, to accomplish this was due to

the manner of treatment, if my experience with such cases goes for anything.

I have had similarly good results in a number of cases of exudative choroiditis, also in cases of central chorio-retinitis, in a number of which central vision came up to a surprisingly good quality in comparison to the visible lesion.

Having under my care at the same time two cases of detachment of the retina in small ridges in the neighborhood of the macula lutea, in both of whom several months of treatment with pilocarpine, rest, etc. had been found useless, I determined finally to try the sublimate injections. I hoped the more to see some good result from them, since I considered these ridge-like folds of the retina due to a more solid exudation upon the inner surface of the choroid. Although these cases were almost parallel in appearance, the one (a young man) received no more benefit from this, than from any other treatment, which may have been due to the fact, that he kept on with his work as a book-clerk; the other, a young girl, on the contrary, began to improve at once and although there are at this time still some raised fold visible in the lower periphery, the largest part of the lesion has disappeared and the macula lutea is free. Vision is almost $\frac{20}{xx}$, and the large scotoma, which had brought her to me, has disappeared.

In the treatment of corneal troubles, particularly in parenchymatous keratitis, the sublimate injection have yielded no beneficial action in my hands.

From the experiences I have gathered with the employment of this new method of treating diverse diseases of the eyeball, I can only join with those, who recommend its use warmly and I think, the reluctance which many may feel in adopting it and which I felt, too, is as far as my experience goes uncalled for. Many times have I hesitated in acute cases, from fear of causing additional irritation and pain, to make a subconjunctival injection, until other treatment had proven useless, when I found that the injection, far from increasing the disagreeable symptoms, speedily relieved them.

I could then not help thinking, that an earlier injection might have brought relief much more quickly.

When undertaken with the necessary asepsis, these sub-conjunctival injections of mercury seem to bring no danger with them and are decidedly beneficial in a great many cases.

CORRESPONDENCE.

AMBLYOPIA FROM SUPPRESSION OF THE VISUAL IMAGE.

IOWA CITY, IOWA, February 3, 1894.

Editor AMERICAN JOURNAL OF OPHTHALMOLOGY.—In the excellent article of Dr. Johnson, in the January number of your journal, on "Amblyopia from Suppression of the Visual Image," it seems to me that the explanation of "amblyopia ex anopsia" is unnecessarily complex. Amblyopia from non-use is found whenever a perfect retinal image fails to be formed, at the point of fixation, in infancy or in early childhood; it more rarely occurs under the same circumstances later in life. This proposition is true whether the failure to form a perfect image is due to hyperopia, myopia, astigmatism, cataract, corneal opacity, or neglect of one eye by selection of the other. Such loss of functional power or rather absence of functional power of an unused organ is universal; but a function never employed, is more completely in abeyance than one once developed and afterwards disused. To secure the perfection of synchronous movements by the two hands of an accomplished pianist, requires the training of each. It seems to me that we need go no further to explain, whether or not there occur ultimately changes in the nerve centers which render it permanent. The enforced use of the squinting eye, in the early years of the affection, *does* develop its use and prevent amblyopia, provided a fair retinal image at the point of fixation be possible. This has been established by a long line of testimony, reaching from de Wenzel, 1808, through Mackenzie to our own time; even Schweigger who considers

the amblyopia as the cause rather than the result, of squint admits this. If by "suppression of the retinal image" be meant the operation of directing the mental effort to one eye, neglecting the other, this is possible in all conditions, and is seen in its most perfect development in alternating squint, where no amblyopia exists. I believe, that the best vision in strabismus is obtained, not by early operation, but by enforced use of the squinting eye, followed by the earliest possible correction of vision of both eyes; beginning this treatment at five years of age, and even later, I have repeatedly secured binocular fixation and vision, without operation. C. M. HOBBY, M.D.

EIGHTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

EDINBURGH, January, 1894.

Editor AMERICAN JOURNAL OF OPHTHALMOLOGY.—The Eighth International Ophthalmological Congress will be held in Edinburgh this year. It has now been decided to have the meeting on August 7, 8, 9 and 10.

The Organizing Committee is anxious to receive as soon as possible the names of all their American confreres who desire to be enrolled as members of the Congress.

They look forward with special interest to having American Ophthalmology largely represented.

You will greatly facilitate arrangements if you will kindly indicate to either of the undersigned whether or not you expect to be able to take part in the proceedings.

GEORGE A. BERRY,
31 Drumsheugh Gardens.

D. ARGYLL ROBERTSON,
18 Charlotte Square.

SELECTIONS.

A PETREFIED EYE.¹

BY JAMES A. LYDSTON, M.D., PH.D.

Through the courtesy of Mr. George B. Davis, of Chicago, I am able to present to the Academy this evening a fossil that I believe presents a typical example of a petrefied eye. The fossil was found at the mouth of Knife River, on the north shore of Lake Superior, in 1886, and was first cut by a Chicago lapidary, named Lyman. In order to demonstrate microscopically the arrangement of its parts, I had a second section made, which shows more clearly the structure of the petrefied formation. The eye was first present to me by Mr. Davis and a reporter for the *Inter-Ocean*, who handed it to me for an opinion. On superficial examination I strongly believed that it was a petrefied eye, and so stated at the time, and now, after more exhaustively investigating the subject, I more fully emphasize this opinion. I have submitted it to the critical eyes of some of the most competent and expert lapidaries, and without exception the conclusion of these connoisseurs has been that nothing like it has ever fallen under their observation, and it seems that a single glance will convince even the most skeptical that aside from the changes consequent upon petrification, it most closely approximates the structure of the human eye, and presents many analogous features.

First, we have its outer layer, which conforms to the sclerotic or outer fibrous envelop of the eye, and apparently in

¹Read before the Chicago Academy of Medicine, November 10, 1893.

keeping therewith we notice that it is denser in its vitreous characteristics, and from the fact that its opaqueness renders its illumination impossible, it appears dark under the microscope just as a piece of chalk looks black when held in front of a flame. Lining this we find a somewhat darker pigmented layer composed of circular light and dark striæ, which answers to the choroidal or pigmentary layer of the eye, and we can microscopically outline its several layers, and can even do so macroscopically under intense illumination with reflected light. We cannot define the retina as in its normal state, except its bloodvessels; it is perfectly transparent, and indistinguishable, and its structure so delicate that it has possibly been obliterated during the petrefactive changes. Furthermore, it is normally so closely approximated to the choroid that fusion would naturally ensue during the process of contraction and shrinkage consequent upon solidification. The vitreous humor or hyaloid body is found in a more or less crystalized form, with here and there darker pigmentary deposits, and prior to the final stages of petrefaction it is probable that the aqueous humor diffused itself throughout the vitreous, thus causing, in combination with the inorganic elements from filtration, a more or less definite crystalloid structure. In regard to the lens, it appears to have been pushed forward into the anterior chamber, and pressed against the iris, and seems to occlude the pupillary opening; in other words, we have here a pretty illustration of *occlusio pupillæ*. The iris is shown in a somewhat typical manner, and displays itself in a mottled or tessellated form, which is quite noticeable in some irides. Its outlines are distinctly perceptible to the naked eye, and are still more conspicuous when inspected by means of transmitted light and a magnifying lens. We then see at the outer quadrant posteriorly a vacuole or air-chamber, which evidently answers to the junction of the anterior and posterior chambers of the eye, as in cases of displacement of the lens the depth of the anterior chamber is greatly increased. Distinct traces of hematine or oxide of iron are to be seen diffused throughout the anterior portion of the eye, and at the latero-median junction of the

iris and sclerotic is found a discoloration, which, though probably due to a disposition of the oxides of iron and manganese, bears a marked semblance to a hyphæma, or effusion of blood into the anterior chamber.

I have searched the literature in the hope that I might find a similar case recorded, but my efforts have been futile. This, however, does not militate against the soundness of the conclusions reached. It may be argued that such a thing is preposterous in the extreme, but when we recall the fact that in certain pathologic condition of the human eye we find calcareous deposits, ossification, and other changes, as, for example, in atrophied eyeballs following panophthalmitis, iridocyclitis, and other destructive inflammatory conditions, and we often meet in enucleation with hardened eyeballs closely resembling stone in their general characteristics—so hard, indeed, that it is almost impossible to make sections of them. I would also cite the changes supervening upon amyloid degeneration of the conjunctiva, it being a noteworthy fact that ossification and calcification occur in the later stages of this affection. We also find in cases of cataracta complicata that the lens assumes a calcareous form, and approximates stone in hardness; and still further, in zonular opacity of the cornea we have calcareous depositions.

Now it seems no more difficult that an eye should petrify under the requisite conditions than that other parts of the human body which are just as prone to petrefactive changes should be thus metamorphosed, and we are aware that in rare instances the flesh, skin, and hair of an animal have been preserved for thousands of years, as in the case of the mammoths entombed within the frozen mud-cliffs of Siberia. In these instances the animal matter has been more or less completely mineralized or petrefied.

The first question that naturally presents itself is: How are the remains of animals and plants preserved? The essential conditions are found only in cases in which the organic remains are protected from air and superficial decay—*e. g.*, over the bottom of lake deposits of silt, peat, marl, etc. Stems,

branches, and leaves of plants, fruits, or seeds, may be carried into these places, as well as the bodies of land animals, insects, and birds; wild animals venturing on the more treacherous watery parts of a peat-bog are sometimes engulfed. The antiseptic qualities of the peat preserve such remains from decay until the more or less complete metamorphosis characteristic of petrefaction ensues. Hence from European peat-masses many remains of deer and oxen have been exhumed.

The history of the fossil presented to you is of such a nature as to lend all of the requisite conditions for petrefaction, and its characteristic wholly support such an assumption. I regard the fossil as a metamorphosed eye that has suffered a rearrangement of its constituents, but with sufficient traces remaining to indicate its previous form and structure. The mere presence of water by reason of its universal solvent action necessitates solution of some of the more soluble portions of the eye, and as condensation ensues they may be re-deposited in a new form. This is a possible explanation of the absence of some of the otherwise normal constituents of the eyeball. Most animal formations are derived from the lower grades of the animal kingdom, such as the mollusca, the actinozoa, and the foraminifera; and the explanation of the greater frequency of petrefaction of marine formations lies in the fact of their submarine habitat, their possession of resisting shells; and the mere fact of their food-supply, consisting as it does largely of crustacea and fish, is in itself a factor conducing to a deposition of lime-salts in their several structures, which would favor petrefaction. On the other hand, specimens from the land very seldom find lodgment in subterranean graves, unless they be twigs, leaves, etc., which are doubtless blown or carried by the winds, and finding a watery grave, that predisposes to petrefactive changes, are accordingly metamorphosed and crystallized. Thus Kirwan says: "North of Quito there is a river that petrefies any kind of wood or leaves. The coral rock, though formed by continuous depositions of polyps, loses by degrees any distinct traces of organic structure, and acquires an internal crystalline structure by water-filtration

through its mass, causing a deposition of lime carbonate, etc."

The eye may be that of a predatory animal, whose remains might readily find lodgment in a subterranean cavern, and thence be carried to a watery bed. Thus the British carboniferous rocks have yielded thirteen genera of labyrinthodonts (anthracosaurus, loxomma, ophiderpeton, pholiderpeton, pteroplax, urocordylus, etc.). These were probably fluviatile animals of predaceous habits, subsisting on fish, crustacea, and other organisms of the fresh or salt waters of the coal lagoons, the largest types measuring from seven to eight feet in length.

In conclusion, I will add to the foregoing remarks that the reasons for styling the fossil a petrefied eye may be expressed in the following:

1. Its history.
2. Its shape.
3. Its structure (showing as it does such a close analogy to the human eye).
4. Its appearance macroscopically and microscopically.
5. If it is not an eye, what is it?

I submit the question to your scientific minds for consideration.—*Medical News*.

THE TREATMENT OF THE VARIOUS FORMS OF CONJUNCTIVITIS AS PRACTICED AT THE GERMAN HOSPITAL.¹

BY LOUIS J. LAUTENBACH, A.M., M.D., PH.D., PHILADELPHIA.

My connection with the Eye Department of the German Hospital dates back to a period of some three and a half years, during which time somewhat over five hundred cases of conjunctivitis have been treated in the clinic. This does not include the cases of hyperæmia of the conjunctiva or of symp-

¹Read before the Philadelphia County Medical Society, December 27, 1893.

tomatic conjunctivitis, so often observed as a consequence of eye strain from refractive disturbances, nor are these cases recorded in the hospital reports, except as to their refractive error: The Eye Department of the German Hospital is under the charge of Dr. Charles S. Turnbull, under whom I serve as Chief of Clinic, and to whom I am indebted for much valuable aid and advice as well as encouragement.

The table here presented gives the number of cases of all the forms of conjunctivitis presenting themselves at the clinic during the years of 1891, 1892 and 1893—a total of 452 cases, as compared with 317 in the years of 1888, 1889 and 1890, showing the clinic to be a growing one, although not rapidly so:

	1891.	1892	1893.	TOTAL.
Conjunctivitis, Acuta	22	32	29	83
" Subacuta.....	20	6	6	32
" Chronica	29	30	36	95
" Blenorrhoea.....	7	4	7	18
" Epidemica.....	17	13	19	49
" Erysipelatosa	15	..	1	1
" Follicularis.....	8	3	15	26
" Phlyctenulosa.....	8	9	23	40
" Trachomatosa	31	22	29	72
" Traumatica.....	5	6	5	16
Totals.....	147	125	160	432

The classification of the various forms of conjunctivitis carries with the ideas of different authors—no two seeming to

use the same nomenclature—their varying views depending, in the main, on the different pathological opinions held by each. For instance, epidemic catarrh is by many classed as a simple acute catarrh. The classification here presented makes no pretense as to being strictly scientific, but will commend itself as being thoroughly practical.

Now, it is not my desire to take up each of these forms individually and study it separately and completely, but rather to indicate some general rules about the treatment; some few thoughts which have come to be very important truths, and to indicate, wherever necessary, any modifications or additions.

The first step in the treatment of all cases of conjunctivitis is necessarily the cleansing of the conjunctiva, not simply the ocular or the palpebral portion, but of the whole conjunctiva including the folds—the lower palpebral fold especially. This necessity exists with the most acute as well as the most chronic, the simplest as well as the most complicated case. It is the key-note of the treatment. If we endeavor to cleanse and do not succeed in thoroughly doing so, we may cure many of our cases, but will not get as prompt nor as good results, and many cases we will find it impossible to cure. For instance, while we may be successful with the simple catarrhs, we will often fail in the epidemic form, and in gonorrhœal conjunctivitis we will invariably fail.

How is the conjunctiva to be thoroughly cleansed? How is it best accomplished? My method is to invariably cleanse first by means of Peroxide of Hydrogen, which I use in full strength, 15 vol. solution (testing over 10 vols. invariably). Now the pure peroxide stings considerably when used on the conjunctiva, often inconveniencing the patient very much, and when the solution is markedly acid it is far more painful, and indeed, is then unfit for use in the eye. The reason that this remedy has, comparatively speaking, met with so little favor among eye surgeons has been mainly because of the marked acidity of many of the solutions. This acidity is not only a cause of much pain but, indeed, sometimes an element of danger, as the congestion of the conjunctiva occasioned, is some-

times sufficient to interfere with the proper nutrition of the cornea.

Having used peroxide of hydrogen steadily for a period of almost ten years, I feel it but right to indicate the basis of my faith. I have in these years used various brands of the solution. For a long time I relied upon the Marchand peroxide and found it fairly stable, but its acidity was so great as to prove a great bar to its use; indeed, very rarely could it be used in the eye without previously neutralizing the free acid. Later on I tried Bene's, and found this to answer my purposes very well, the acidity being still noticeable, however. Among others, which I tried some three years ago, was that manufactured by the Oakland Chemical Co., and I to-day rely mainly on that preparation. It is fairly constant in the amount of Oxygen it contains; fairly stable; is not much deteriorated by moderate changes in temperature; and the amount of free acid present is very small. It tests beyond 10 vols. invariably, usually from 12 to 16 vols. At the hospital I employ the Rosengarten brand and find that it and the Oakland are much the same in their action. Between the two I can detect no marked difference. I lately tried Peuchot's, but find it entirely too acid to be used in the eye.

Of all the kinds I have employed, having experimented with upward of a dozen I can recommend for use in the eye only the preparations of Bene, of the Oakland Co., and Rosengarten's. The characteristics which these preparations have in common and which should be possessed by any peroxide employed, are first, invariably testing beyond 10 vols., preferably between 12 and 16 vols. of oxygen; second, in being fairly stable—not losing their oxygen upon slight changes of temperature; third, and most important: having little or no free acid present; the amount of acid should be as small as is consistent with the stability of the preparation.

By the use of a pure preparation, the entire conjunctiva can be most thoroughly cleansed; not only will the discharge on the surface be washed off, but that lying in the crevices and chinks will be decomposed and washed out.

A word as to the method of use. From 10 to 30 drops of the solution should be instilled at the outer canthus and the eye then closed, and with the fingers a degree of massage applied over the entire surface of both eyelids. Then the eye should be looked at, and, if necessary, a second, a third, and even a fourth application should be made. Often in trachomatous cases, after its application, it is well to evert the trachomatous lid, and, with the rubber end of an eye dropper, rub its conjunctival surface. The thorough application of the peroxide should invariably be followed by the liberal use of a saturated solution of boracic acid. This will wash out all the debris and soothe the possibly irritated conjunctiva.

This treatment I never intrust to the patient, but always do it myself, using it as often as necessary from twice a week to once or twice a day. Occasionally I allow a patient to use a weaker solution of the peroxide, from a three to an eight volume solution, but never stronger, used once or twice a day. The cleansing method that I advise the patient to follow is the liberal use of a saturated solution of boracic acid as a wash or eye bath, used almost invariably as hot as the eye can bear, from two to eighteen times a day, even every half hour in many gonorrhœal cases.

Having thus thoroughly cleansed the conjunctiva, we have a surface upon which we can apply our appropriate remedies and are sure they will have the maximum effect. Not that it will always be necessary to employ anything beyond the cleansing before indicated, as indeed we will find many mild cases of conjunctivitis yield through these simple means.

In cases of *acute conjunctivitis*, when further treatment is indicated, we direct the patient to use a mild solution of acetate or sulphate of zinc, or a solution of borax in camphor water, advising the hot boracic acid solution as a wash.

In *sub-acute conjunctivitis* we employ usually either the solution of sulphate of zinc or of copper.

In *chronic conjunctivitis* especially if there be much thickening of the conjunctiva, I direct, in addition to the treatment employed in the subacute cases, the use of massage on the

eyelids three times a day immediately following the instillation of castor oil (the oil to be used after the eye has been thoroughly bathed with hot boracic solution and roughly dried). The persistence in this method has, in numerous cases, been followed by what might almost be termed marvelous results.

In *conjunctivitis blenorrhœica* or gonorrhœal conjunctivitis, the peroxide treatment is to be used regularly once a day, and in very virulent cases twice a day. It is to be followed by the boracic acid solution, and this in turn by a strong solution of nitrate of silver brushed upon the lids with a small pledget of cotton on a cotton holder. I never employ brushes as I consider them incapable of being kept clean. Upon the first visit, I usually use a solution of 60 grains to the ounce; on the second day, if necessary, I employ the same solution, or may even use a solution as weak as 5 grains to the ounce, or any strength between the two. Of course, in using such strong solutions, care must be taken to limit their action to the conjunctiva—not to allow a drop of it to touch the cornea, and to neutralize any excess of solution immediately. If there be much conjunctival swelling, especially if the circumcorneal conjunctiva, and particularly if this threatens the nutrition of the cornea, I scarify this freely in several places in lines radiating from the cornea. After the use of the nitrate of silver, I again wash with boric acid solution and send the patient home, with directions to wash the eye with hot boracic acid solution either every 30 or 60 minutes as circumstances demand, and to use 2 drops of a two grain solution of nitrate of silver twice a day, and report the next day. Since adopting this method I have not had a case to resist a cure for over seven days, and in one instance, had a perfect eye after three days. I invariably direct these patients to use smoked glasses, as they, in addition to protecting the eye from the dust, light and wind, prevent him from wiping them as much as he otherwise would.

Epidemic conjunctivitis is treated in much the same way, except that the peroxide and boracic acid solutions are followed by a solution of nitrate of silver of five grains to the ounce, and the patient is directed to bathe the eye with boracic acid

solution every hour or two, and to use a one-grain to the ounce solution of nitrate of silver twice a day, and to wear smoked glasses.

In *follicular conjunctivitis* the cleansing is the same. This may often be followed by the application of the alum stick, or sometimes the follicles are opened, or castor oil may be used by the massage method; the patient is directed to use the hot boracic acid solution as a wash three or four times a day, and the castor oil after each cleansing; again, at times, I direct an ointment of acetate of lead, one grain to the ounce, to be used in the lower lid at night. Of course, this is never to be ordered without cautioning the patient never to use the ointment for any other treatment than the present one, as it is never to be employed unless the cornea be intact.

In *conjunctivitis phlyctænulosa*, the cleansing is employed as above and is followed by the use of atropia, and this again, perhaps, by calomel. The patient is directed to use the hot wash four times a day with, perhaps, a weak solution of atropia and the yellow oxide of mercury salve at night, protecting the eyes by means of smoked glass.

In *conjunctivitis trachomatosa*, the cleansing is invariably very thoroughly employed, and any source of irritation, such as misplaced cilia is, if possible, removed; all trachoma granules present are opened and thoroughly scraped out, any contracting bands being superficially incised and redundant tissue, if present, removed.

After this, peroxide is to be employed; to be followed, if necessary, with alum, sulphate of copper, or nitrate of silver in stick. The patient is directed to cleanse the eye thoroughly and frequently with hot boracic acid; to, in some cases, use castor oil with massage, either alone or in connection with the yellow oxide of mercury ointment at night; treating sequelæ as they arise.

In connection with the above local treatment there should be employed whatever general treatment may be found necessary. This is indeed often of the utmost importance in this class of patients. We will not here enlarge upon this subject.

Each patient is a law unto himself and must be treated accordingly, but the key-note should be to rectify any abnormal conditions needing correction, and to restore the body to as nearly a normal one as is possible.

The above is necessarily but a brief outline. It has been presented thus with the object of calling attention to what I deem the foundation stone of the successful treatment of inflammation of the external parts of the eye—cleanliness and thoroughness. It is a truth which holds good in the treatment of the cornea as well as the conjunctiva. I wish to call attention to the method of obtaining cleanliness—the most thorough with which I am acquainted; and secondly, to the use of massage as one of the efficient but little used methods of treating conjunctival affections, especially conjunctival thickenings. Medicines prepared as ointments or as solutions in some oily menstruum lend themselves readily to this mode of treatment; thirdly, I have desired to call attention to the wonderfully successful results of the above treatment of gonorrhœal conjunctivitis; and fourthly, I have wished to call attention to the method in phlyctænular cases, as upon numerous occasions we have had cases which having proven unusually intractable at other hospitals, but have readily succumbed under our method. In cases of phlyctænular diseases involving the cornea, this has been more often and more thoroughly illustrated than in the simple conjunctival cases. I recall two such cases now under treatment. One of a boy of twelve, who in a month, has obtained a better result than had been accomplished at any time during the past ten years of almost continuous treatment at other institutions in this and other cities. Upon several occasions, he was house-patient at various eye-hospitals. The other, a parallel case, is the one referred to in my paper on phlyctænular conjunctivitis in the *Rhode Island Medical Society Monthly*, November, 1893, page 530.

The conclusions which I have reached as a result of my hospital work are: that in these cases, thoroughness, especially in cleanliness, is essential; that the entire conjunctival cavity must be effectually cleansed and prepared for any such

curative agent which we may desire to use; and in addition to this, the patient should be directed to keep the eye as clean as is possible, but necessarily he can not do this as thoroughly as we can. Every case should be seen as often as necessary; in cases of doubt, have the patient come rather too often than not often enough. If necessary for the welfare of the case, donate some of your time at your office; do for him all you can and always as thoroughly as necessary, even more so. If you fail at all, fail in doing for him too much. The results thus obtained will sometimes be unexpected, but ever gratifying.—*Transactions Philadelphia County Medical Society.*

OPHTHALMOPLEGIA¹

BY GUSTAV DRESEL, M.D., SAN FRANCISCO.

My excuse for presenting this case to the Society is not only its intrinsic interest to an oculist in particular, but to a general practitioner as well. The patient was handed over to me on the 29th of last month by Dr. Morse, the surgeon of the German Hospital, to determine whether his eye symptoms pointed to a fracture or any lesion in the base of the cranium. The history of the case is, in short, this:

Mettewald F., æt. 41; married, laborer. Was accidentally struck on the back of the head, on September 1, by an elevator. The blow was received on the cranium at a point corresponding about to the articulation of the occipital with the posterior part of the parietal bone, tearing the scalp and tissues and exposing the bone. Whether it was fractured or not is doubtful, as the wound had been sutured in the Receiving Hospital, and it was three days before the case entered the German Hospital. The wound being perfectly aseptic, the sutures

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were not removed for examination. Patient says he had, however, been unconscious (not knowing of the injury), and though he could not walk from the shock, he could freely move his hands. There were lacerations about the face, and there was considerable suggillation about both eyes, and he is said to have had hæmorrhage from both ears. Patient was put to bed and ice to head and ice-compresses to face were ordered.

When I saw the patient for the first time he presented materially the same general appearance and symptoms as at present; his intellect and his speech are *perfect*; his hearing, his sense of smell and taste are perfect, as well as the movements of his tongue and those of the muscles of his face. Examining his eyes, we find his left eye perfectly normal in every respect; every muscle of the eyeball is intact his pupil reacts readily upon *light and convergence*, and his power of *accommodation* is normal; the back-ground is normal and the eyesight is $\frac{6}{VI}$. His right eye, however, shows a drooping of the upper lid, a marked loss of movement of the eyeball *downward* as well as downward and outward, with rotation of the upper part of vertical meridian *inward*; a marked loss of upward movement, as well as upward and outward, with the rotation of the upper part of the vertical meridian *outward*; and a loss of movement of the eyeball *outward*; on the other hand, the movement *inward* remains *almost* normal. At the same time we notice that the size of both pupils is the same, that the right pupil reacts perfectly upon *light and convergence*, and upon examination we also find his power of *accommodation* normal. The back-ground is normal and the eyesight almost $\frac{6}{VI}$.

Recapitulating: We have found a paresis of all the muscles of the eyeball, innervated by the oculo-motorius, *except* the *internal muscles*, viz., the sphincter pupillæ and tensor choroideæ, and the rectus internus; we have also found a paresis of the abducens, and of the trochlearis (or pathetic), while the muscles of the left eye are perfectly sound. This diagnosis, made from a rough examination of the movements of the eyeball, is perfectly sustained by a more accurate examination of the *diplopia* present, which, although apparently very complex, is how-

ever, simple, if we bear in mind, that paralysis of the abducens as well as of both obliqui, causes *pathological convergence*, and in consequence *homonymous diplopia*; while a paralysis of the rectus internus, rectus superior and rectus inferior causes *pathological divergence*, and in consequence *crossed diplopia*. In this case, where the rectus externus is paralyzed, while the rectus internus is almost intact, we will consequently have *homonymous diplopia* in the whole field of vision. We find, in holding the candle straight *downward*, homonymous diplopia, image of *right eye* lower than that of the *left*; moving the candle to the left for fixation *downward* and *inward*, we have a marked increase in the *vertical* distance of the two images, and the image of *right eye* apparently nearer to the patient; moving the candle to the right for fixation *downward* and *outward*, we have a large lateral distance of the two images, on account of the paresis of the rectus externus and but a slight increase of the vertical distance of the two images—a sure sign of paresis of the obliquus superior and rectus inferior. Holding the candle straight upward, we have homonymous diplopia, the *image* of the *right eye* *higher* than that of the *left*; moving the candle to the left for fixation *upward* and *inward*, we have a *well pronounced increase* in the *vertical* distance of the two images (*Vide: Maunthner.—Lähmung des musculus obliquus inferior.—Wiener Med. Blätter*, 1893, No. 18, 19, 20), while moving the candle to the right for fixation upward and outward, we have, besides the large vertical distance of the images, but a *very slight* increase of the vertical distance of the two images—a sure sign of paresis of the obliquus inferior and of the rectus superior.

This, then, is a well pronounced case of *ophthalmoplegia exterior unilateralis imperfecta*. Now, let us determine the seat of the lesion to the III, IV and VI nerves; it may be situated either *within the orbit*, or *within the cranial cavity*. The first we may exclude immediately, as the *internal* muscles of the eye are intact, and as there is not the least sign of an affection of the muscles, *as such*. The second, the intercranial lesion, may be situated at the base of the skull, that is, anywhere in

the course of the nerves after leaving the brain up to their entrance into the fissura orbitalis superior—in this case an absolute impossibility, as the internal muscles, viz., the sphincter pupillæ and accommodation muscles, are perfectly intact; and as the III, of course, after leaving the brain forms *one* nerve. Or the lesion may be situated within the brain itself, either involving the fascicle of nerve-fibers passing from the cortex to the nuclei, or involving directly or indirectly the nuclei themselves of the III, IV and VI nerves. If the first were the case, we would have a hemiplegia of the opposite side, of which there has never been the least sign, and many other symptoms besides. So, by exclusion, we find that the severe blow on the back of the head of our patient has caused a hæmorrhage in the region of the *nuclei* of the III, IV and VI nerves *of the right side*.

Now the nucleus of the III extends from the posterior end of the floor of the 3rd ventricle backwards along the floor of the aquæductus Sylvii to below the posterior corpora quadrigemina, immediately followed by the larger ganglionic cells of the nucleus of the IV nerve—so that Meynert even speaks of one oculomotorio-trochlearis nucleus. The nucleus of the VI lies about in the center of the floor of 4th ventricle below its gray surface. Our diagnosis is sustained by another important clinical symptom, which points to a lesion of the 4th ventricle, namely, the patient complains of an increase in the quantity of urine he passes. The specific gravity of this urine is 1010, no sugar, no albumen. Drs. Hassler and von Adelung, the internes of the German Hospital, have carefully measured the quantity of fluids the patient gets within 24 hours, and the quantity of urine passed within the same time, for several days in succession, and have found that his urine averages about five pints daily— $\bar{5}xx$, more or less, in excess of fluids taken.

What conclusions may we draw from this case? that there exists a nuclear unilateral ophthalmoplegia, caused by the disease of the nuclei of the nerves of one side, and that, at least in this case, *the nuclei of all the motor nerves of each eye are situated on the same side as the respective eye*. The trochlearis

of this patient does not completely decussate in the substance of the velum medullare anterius with that of the other side, as has been authoritatively asserted by *Kölliker*, *Stilling* and many others; nor does it do so partially, as asserted by *Henle*, for the obliquus superior of the left side is perfectly intact and we cannot possibly believe that the nucleus of the IV should have remained untouched by the lesion, which struck the neighboring nucleus of the III, or that the nucleus of the IV on the left side should alone have been affected. Nor is it probable that, in our case, there be a direct connection between the nucleus of the IV on one side and part of the fibers of the III and IV of the opposite side. It is in fact difficult to comprehend how unilateral ophthalmoplegia can ever be the consequence of disease of the nuclei of the same side, if there should exist a total or partial decussation of the nerves.

In this case the muscles most affected are: the rectus inferior and obliquus superior; then the levator palpebræ superioris, the rectus superior and obliquus inferior; while least affected is the rectus internus, and not at all the sphincter pupillæ and accommodation muscles. We may, therefore, infer from this, with great probability, that the centers for the rectus inferior and obliquus superior are situated nearest to each other, as well as those for the levator palpebræ superioris, the rectus superior and obliquus inferior; and again, those for the rectus internus, sphincter pupillæ and tensor choroideæ. If we now examine the location allotted to the separate centers for the different muscles of the III by *Völckers* and *Hensen*, by *Kahler* and *Pick*, and lately by *Staar* and *Perlia*, results obtained by these authors chiefly from their anatomical and experimental studies, we find that our case corresponds best with *Kahler* and *Pick*'s results. The latter place most anteriorly in the posterior end of the third ventricle the centers for accommodation, and that for the sphincter pupillæ; next to the last on the medial side of the floor of the aquæductus Sylvii, that for the rectus internus; and on the lateral side, those for the levator palpebræ superioris, the rectus superior and obliquus inferior; while again, to the

medial side nearest to the nucleus of the trochlearis, that for the rectus inferior.

In conclusion, let us see how it is possible that a hæmorrhage should have affected the nuclei of all the motor nerves of the eye, with the exception of the centers of the internal muscles of the eye. We know that the vascular supply of the cortex of the brain is quite different from that of the base; the former is fed by arteries with manifold anastomoses, while the latter is supplied by end-arteries, according to Cohnheim. Now it has been shown that the region to which the centers for accommodation and pupil belong is fed by the ramus communicans posterior, while that of the centers of the external muscles is fed by the arteria cerebialis posterior.

In regard to the prognosis of this case, I can but say with *Mauthner*: "The prognosis of nuclear paralysis due to traumatic hæmorrhage is unknown."—*Pacific Medical Journal*.

THE EYE TREATMENT OF EPILEPTICS

BY A. L. RANNEY, M.D.

I would formulate my conclusions, as the total result of my observations of the eyes of epileptics, as follows:

1. In epilepsy I regard an examination of the eyes (for errors of refraction) and of the eye muscles (for heterophoria) as the first and perhaps the most important step toward a search of sources of reflex nervous disturbance.

2. No final conclusion should be reached regarding the presence or absence of heterophoria until sufficient time, patience, and skill has been bestowed upon the investigation by one who is thoroughly familiar with and practices the *later methods* for the *determination of "latent" heterophoria*.

3. All preparations of bromides and other drugs that tend to control the seizures should be withheld, as a rule, from an epileptic patient until all possible sources of reflex irritation have been scientifically sought for and, as far as possible, relieved.

There may be justifiable reasons, to my mind, for *exceptional departures* from this rule; but I wish to emphatically raise my voice here in protest against the prevalent system of drugging epileptic patients from the date of the appearance of the first fit without any attempts being made to ascertain what the causes of the epilepsy may be.

4. I strongly advocate the *employment of atropine in every case* before a final decision is reached regarding the refraction of an eye.

I also believe that in epileptic cases it is wise to insure a full correction of any existing astigmatism (by glasses to be worn constantly in well-fitted spectacle frames), and as near a

full correction by spherical glasses of any latent hypermetropia that is detected as the patient can be made to tolerate, even if atropine has to be instilled at intervals into the eyes of the patient for several weeks to prevent a return of ciliary spasm.

I have observed many cases of chronic epilepsy that have been relieved of all convulsive seizures so long as the full effect of atropine upon the ciliary muscles was maintained.

5. *No promises that absolute cure can be effected by eye treatment should ever be made to an epileptic;* but it is usually safe for the physician and patient to hope that a radical correction of marked heterophoria and abnormal refraction will eventually be followed by decided and permanent benefits.

6. The results in all cases thus far treated by me seem to warrant the conclusion that at least *ninety per cent. of chronic epileptics have been better without bromides*, after a satisfactory correction of their eye defects, than they ever were when subjected to the influence of drugs. *Some have apparently been cured.*

It should be remembered that a victim to chronic epilepsy who is rendered by any treatment as free from attacks without the bromides as when under their deleterious influence has been *very markedly benefited*; again, that if a marked diminution of the attacks has been effected, the patient has double cause for gratitude; finally, that if the attacks are arrested *in toto* without drugs, it is to-day one of the most remarkable facts recorded in medical literature.

7. In cases where negative results have been observed in spite of a satisfactory investigation and correction of marked heterophoria and abnormalities of refraction, I would deem it wise before resorting to drugs for epileptic seizures to search for other sources of reflex peripheral irritation (such, for example, as bad teeth, phimosis, rectal or uterine disease, scars, etc.).

Furthermore, the detection of chronic kidney disease, syphilis, organic brain lesions, and depression of the skull, is most

important prior to the beginning of eye treatment or a search for other forms of peripheral reflex disturbances.

8. The treatment of heterophoria by *prismatic glasses alone is not curative*; nor, in my opinion, are very marked beneficial results to be expected from them. Prismatic glasses are valuable aids, however, in determining the existence and amount of "latent" heterophoria prior to the radical correction of such defects by graduated tenotomies.

9. *The duration of the eye treatment of epilepsy varies with the eye problems encountered.*

The establishment of orthophoria is not commonly effected in epileptics inside of one year; and long intervals of rest between the surgical steps may be demanded and thus extend this limit of the time to two or even three years.

For the past five years I have refused to begin work upon the eye of any epileptic unless I was assured that I could control the patient for a period of at least twelve months, and see the patient at such intervals as I deemed necessary during that period. It is better in this work "to be sure than sorry," and experience has taught me that it is much safer to do it slowly than rapidly.

With a full knowledge of the method, its intricacies, and its difficulties, *conclusions should never be too hastily arrived at* in any given case. Those who have the largest experience may occasionally make mistakes in judgment when a peculiarly complex problem is presented for solution. How much easier is it, therefore, for one with a limited experience to fall into error! The story is told that a selection for a pilot of a vessel laden with precious merchandise which was to enter a harbor full of sunken ledges and sandbars was once being made. One by one the applicants told a tale of uninterrupted successes. Finally one pilot was accepted simply because he said, "I ought to know the channel, as I've wrecked a ship on every rock in this harbor."

So it is with many cases of epilepsy, chorea, insanity, and kindred nervous affections. These patients have, as a rule, acquired and constantly practiced from birth *certain faulty*

combinations of the various eye muscles in order to enable them to use the eyes together.

They are often able, by the aid of such unnatural combinations, to *simulate* a condition of apparent equilibrium of adjustment of the eyes, although a very serious expenditure of nerve force may be demanded of them in order to do so. They are naturally unconscious of the eye-strain, because they think everybody does, as they do, in order to see. They often have no eye symptoms. They practice these "tricks of adjustment" instinctively, not as an act of volition; and they have generally to be taught, by the aid of prismatic glasses and other recognized steps, to abandon them and thus to disclose the actual maladjustment of their eye-muscles which has entailed upon them this long-continued leak of nerve force.

10. Too much stress can not be laid upon the importance of accurately centering all spherical and cylindrical glasses to the pupils when prescribed.

An imperfectly fitted frame may prove a source of great injury to a patient.

Moreover, a decentered glass may often lead a careful observer into serious error respecting heterophoria.

It is remarkable how few opticians are properly educated in the fitting of frames. A casual glance at the eye-glasses and spectacles worn at social gatherings and in street cars, theatres, etc., by people able to purchase of the best opticians, will demonstrate the statement that but a very small percentage wear glasses that are even an approach to the proper relationship to the pupils.

It has been a rule in my office for years to allow no patient to wear a glass that I have not personally tested and passed upon as properly ground and centered to the pupils. I also instruct each patient regarding the necessity of having the frames straightened when bent or whenever the lenses tend to droop.

I do not believe in decentering any glass, even intentionally to take the place of a prism.

Some months ago a patient took the long trip from Tacoma

to New York in order to consult me regarding a sudden change in the vision of one eye that greatly alarmed him. I had previously given him for constant wear cylindrical glasses in a spectacle frame and he had changed them to a pair of eye-glasses. The bending of the frame had changed the axis of the cylinder of the right eye. Within a space of five minutes this was corrected, and all his alarm disappeared at once because his vision immediately became normal.

11. The objections that are raised before patients by many physicians and some oculists to the performance of a graduated tenotomy upon an eye muscle "because of its risk, danger of overcorrection, etc.," too frequently cause unnecessary alarm and often prevent patients from obtaining the relief that is within their grasp, and which prismatic glasses have not and will not afford.

Since the employment of cocaine as a local anæsthetic the patient *suffers no pain during this operation* and but little discomfort after it.

Furthermore, the operation as now performed does not necessitate any confinement to the house, and all surgical dressings to the eye are avoided.

That the successful operator must possess skill and a high grade of technique (acquired by constant practice in that special line of surgery) is apparent; but I believe that the danger of overcorrection is very small in operating properly for heterophoria, and, in the hands of an expert, an overcorrection is very readily controlled and rectified. I do not recall a case within the past eight years where I have had a moment's anxiety resulting from an overcorrection, although I have in that time performed at least one thousand graduated tenotomies upon the muscles of the orbit.—*New York Med. Jour.*

THE TREATMENT OF BLEPHARITIS MARGINALIS BY HYDROGEN DIOXID.

BY S. C. AYRES, M D., OF CINCINNATI, OHIO.

The treatment of blepharitis marginalis is often unsatisfactory and disappointing. Relapses frequently occur, and remedies seem to lose their effect, and at times even to act unfavorably. It is true that much of our success depends on the faithfulness of the patient or of his parents in carrying out the treatment at home. Much also depends on the physical condition of the patient, and this should always receive careful attention. Anomalies of refraction seem to play an important rôle in perpetuating the disease, and these also should be carefully corrected. But aside from these considerations, the treatment is often prolonged, taxing the patience of the physician as well as of the client.

The remedies prescribed for the relief of this disease are numerous, and all have met with more or less success. During the past year I have used with great satisfaction hydrogen dioxid in the treatment of this disease. I was led to its use by some experiments in cases with suppurating rings around the cilia. After removing the crusts and applying the dioxid, there was a bubbling and boiling effect for a while, which soon subsided, leaving the ulcerated surface whitened, as if a solution of silver nitrate had been used upon it. The application was almost painless, and the lid was left clean and free from pus or scales.

These experiments were followed by a general adoption of this method in nearly all cases, but especially in those with ulcerations along the lid-margin. My experience in a large number of cases justifies me in recommending this treatment,

so that others may give it a trial. The manner of its application is as follows: The larger crusts should first be removed or scraped off, after having been softened by tepid water. Then a little cotton is wrapped tightly around a Japanese tooth-pick, which is dipped into the dioxid in a little dish. The cotton is then swept over the entire edge of the lid. The characteristic bubbling will follow, and the application is repeated until the bubbling ceases. The ulcers will then present a whitish appearance. If care is taken, and the cotton is not too freely saturated, none will come in contact with the conjunctiva. In order to obviate all pain, a few drops of a 4 per cent. solution of cocaine can first be instilled into the eye. This treatment should be repeated every day. The remedy is one that any intelligent person can apply at home, and one from which there is no danger. My experience with the use of salves and ointments is somewhat disappointing. They often cause unaccountable irritation, and on this account are unreliable. In the method advised a clean remedy is used, which acts promptly and efficiently. By its chemic action it destroys the germs which cling so closely to the edges of the lids. It is not a cure-all or a specific, but I certainly have had the happiest results from its use.—*Medical News*.

DR. LUCIEN HOWE.

Dr. Lucien Howe, of Buffalo, was elected a member of the Ophthalmological Society of the United Kingdom (Great Britain and Ireland), on December 14, 1893. This exceptional honor, we believe, has been conferred in but one other instance on a resident of the United States.